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09/729,939	12/05/2000	Rajashri Joshi	N0080 US	1111
37583	7590	04/21/2005	EXAMINER	
NAVIGATION TECHNOLOGIES 222 MERCHANDISE MART SUITE 900, PATENT DEPT. CHICAGO, IL 60654			CHOJNACKI, MELLISSA M	
			ART UNIT	PAPER NUMBER
			2164	

DATE MAILED: 04/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/729,939

Applicant(s)

JOSHI ET AL.

Examiner

Mellissa M Chojnacki

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 02 December 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-37 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

  
**SAM RIMELL**  
**PRIMARY EXAMINER**

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

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## DETAILED ACTION

### Remarks

1. In response to communications filed on December 2, 2004, claims 1, 14, 16, 23 and 29 are amended, and new claims 36-37 are added per applicant's request. Therefore, claims 1-37 are presently pending in the application.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-3, 8-14, 16-27, 29-34 and 36-37 rejected under 35 U.S.C. 102(b) as being anticipated by Sennott et al. (U.S. Patent No. 5,438,517).

As to claim 1, Sennott et al. teaches a method for representing geographic features in a computer-based system (See abstract), comprising:

providing a first computer-usable database storing a plurality of data points specifying coordinates of locations along at least one geographic feature (See column 49, lines 58-68; column 50, lines 1-57);

fitting a polynomial spline to the at least one geographic feature by applying a least squares approximation to the data points to generate a plurality of control points for the polynomial spline (See column 17, lines 47-55; column 50, lines 58-66; column

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51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55);

storing the control points in a second computer-usable database, the control points being usable for representing the geometry of the at least one geographic feature in the computer-based system (See column 29, lines 5-11 column 50, lines 5-57; column 51, lines 11-18).

As to claim 2, Sennott et al. teaches wherein the data points are selected from the group consisting of coordinate pairs and coordinate triples (See column 15, lines 27-37; column 41, lines 7-14; column 50, lines 5-15).

As to claim 3, Sennott et al. teaches configuring the number of control points (See column 50, lines 5-57).

As to claims 8, 20, 24 and 30, Sennott et al teaches incorporating in the least squares approximation a bearing value associated with a node included in the plurality of data points (See column 17, lines 47-55; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55); incorporating in the least squares approximation a bearing value associated with a node included in the plurality of data points (See column 17, lines 47-55; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines

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31-34, lines 47-55); wherein the spline control points are derived by incorporating in the least squares approximation a bearing value associated with a node included in the plurality of data points (See column 17, lines 47-55; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55); wherein the processor is configured to incorporate in the least squares approximation a bearing value associated with a node included in the plurality of data points (See column 17, lines 47-55; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55).

As to claims 9, 21, 25 and 31, Sennott et al., teaches weighting a node included in the plurality of data points in the least squares approximation (See column 17, lines 47-55; column 50, lines 5-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55); weighting a node included in the plurality of data points (See column 17, lines 47-55; column 50, lines 5-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55); wherein the spline controls points are derived using the least squares approximation by weighting a node included, in the plurality of data points (See column 17, lines 47-55; column 50, lines 5-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55); wherein the processor is configured to weight a node included in the plurality of data points in

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the least squares approximation (See column 17, lines 47-55; column 50, lines 5-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55).

As to claims 10, 22, 26 and 32, Sennott et al., teaches employing regularization in computing the least squares approximation (See column 17, lines 47-55; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55); employing regularization in the least squares approximation (See column 17, lines 47-55; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55); wherein the spline control points are derived by employing regularization in the least squares approximation (See column 17, lines 47-55; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55); wherein the processor is configured to employ regularization in computing the least squares approximation (See column 17, lines 47-55; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55).

As to claims 11, 17, 27 and 33, Sennott et al. teaches identifying a straight section of the at least one geographic feature (See column 46, lines 21-30; column 51, lines 39-50, lines 65-68; column 52, lines 1-5; column 54, lines 67-68; column 55, lines

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1-4); and storing in the second computer-usable database the data points corresponding to the straight section (See column 46, lines 21-30; column 51, lines 39-50, lines 65-68; column 52, lines 1-5; column 54, lines 67-68; column 55, lines 1-4); identifying a straight section of a geographic feature based on the data points (See column 46, lines 21-30; column 51, lines 39-50, lines 65-68; column 52, lines 1-5; column 54, lines 67-68; column 55, lines 1-4); and storing in the computer-usable database the data points corresponding to the straight section of the geographic feature (See column 46, lines 21-30; column 51, lines 39-50, lines 65-68; column 52, lines 1-5; column 54, lines 67-68; column 55, lines 1-4); wherein the processor is configured to determine whether the geographic feature includes a straight section, and if so, linearly interpolate the data points representing the straight section (See column 46, lines 21-30; column 51, lines 39-50, lines 65-68; column 52, lines 1-5; column 54, lines 67-68; column 55, lines 1-4); wherein the processor is configured to determine whether the at least one geographic feature has a substantially straight section, and if so, to store in the second computer-usable database the data points corresponding to the straight section (See column 46, lines 21-30; column 51, lines 39-50, lines 65-68; column 52, lines 1-5; column 54, lines 67-68; column 55, lines 1-4).

As to claims 12, 18 and 34, Sennott et al. teaches computing the control points only for one or more curved sections of the at least one geographic feature (See column 46, lines 21-30; column 51, lines 39-50, lines 65-68; column 52, lines 1-5; column 54, lines 67-68; column 55, lines 1-4); computing the control points only for one or more

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curved sections of the geographic feature (See column 46, lines 21-30; column 51, lines 39-50, lines 65-68; column 52, lines 1-5; column 54, lines 67-68; column 55, lines 1-4); wherein the processor computes the control points only for one or more curved sections of the at least one geographic feature (See column 46, lines 21-30; column 51, lines 39-50, lines 65-68; column 52, lines 1-5; column 54, lines 67-68; column 55, lines 1-4).

As to claim 13, Sennott et al. teaches computing the control points such that the tangent to the spline approximation of a curved section of the at least one geographic feature and the tangent to the straight section are equal at the point at which the curved and straight section meet (See column 67, lines 9-19).

As to claim 14, Sennott et al. teaches a method of displaying on a computer output device a function representing a geographic feature (See abstract), comprising:

retrieving from a computer-usable database a plurality of spline control points associated with the geographic feature (See column 49, lines 58-68; column 50, lines 1-57), the spline control points being derived, using a least squares approximation, from a plurality of data points specifying latitude and longitude coordinates of locations along the geographic feature (See column 17, lines 47-55; column 21, lines 64-68; column 22, lines 1-3; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55);

calculating a polynomial spline using the spline control points to generate the function representing the geometry of the geographic feature (See column 17, lines 47-



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55; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55); and displaying the function on the computer output device (See column 29, lines 5-11 column 50, lines 5-57; column 51, lines 11-18).

As to claim 16, Sennott et al. teaches a method of generating a computer-usable database that represents feature geometry using a plurality of spline control points associated with a plurality of geographic features (See abstract), comprising:

providing a predetermined database that represents feature geometry using a plurality of data points specifying latitude and longitude coordinates of locations along the geographic features (See column 21, lines 64-68; column 22, lines 1-3; column 49, lines 58-68; column 50, lines 1-57);

for each of the geographic features, retrieving a corresponding set of data points specifying latitude and longitude coordinates from the predetermined database (See column 21, lines 64-68; column 22, lines 1-3); and

fitting a polynomial spline to each of the geographic features by computing a plurality of control points yielding the least squares approximation to the corresponding set of data points specifying latitude and longitude coordinates (See column 17, lines 47-55; column 21, lines 64-68; column 22, lines 1-3; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55);

storing the plurality of spline control points in the computer-usable database (See column 29, lines 5-11 column 50, lines 5-57; column 51, lines 11-18).

As to claim 19, Sennott et al. teaches computing the control points for a geographic feature that has a curved section and an adjoining straight section such that a bearing value at an endpoint of the curved section equals a corresponding bearing value at an endpoint of the straight section that meets the curved section (See column 46, lines 21-30; column 51, lines 39-50, lines 65-68; column 52, lines 1-5; column 54, lines 67-68; column 55, lines 1-4).

As to claim 23, Sennott et al. teaches a system for displaying a function representing the geometry of a geographic feature (See abstract), comprising:

a database storing one or more spline control points associated with the geographic feature (See column 21, lines 64-68; column 22, lines 1-3; column 49, lines 58-68; column 50, lines 1-57), the spline control points being derived, using a least squares approximation, from a plurality of data points specifying latitude and longitude coordinates of locations along the geographic feature (See column 17, lines 47-55; column 21, lines 64-68; column 22, lines 1-3; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55);

a processor configured to compute a polynomial spline using the spline control points to generate the function representing the geometry of the geographic feature

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(See column 17, lines 18-28, lines 47-55; column 21, lines 64-68; column 22, lines 1-3; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55);

and a display device for displaying the polyline (See column 29, lines 5-11 column 50, lines 5-57; column 51, lines 11-18).

As to claim 29, Sennott et al. teaches a system for generating a plurality of spline control points that represent feature geometry (See abstract), comprising:

a first computer-usable database for storing a plurality of data points specifying latitude and longitude coordinates of locations along at least one geographic feature (See column 21, lines 64-68; column 22, lines 1-3; column 49, lines 58-68; column 50, lines 1-57); and

a processor configured to apply a least squares approximation to the data points specifying latitude and longitude coordinates to generate the plurality of control points for a polynomial spline (See column 17, lines 47-55; column 21, lines 64-68; column 22, lines 1-3; column 50, lines 58-66; column 51, lines 65-68; column 52, lines 1-5; column 56, lines 6-27; column 71, lines 15-20, lines 36-41; column 72, lines 31-34, lines 47-55);

a second computer-usable database for storing the control points (See column 29, lines 5-11 column 50, lines 5-57; column 51, lines 11-18).

As to claim 36, Sennott et al. teaches wherein the geographic feature is a road (See column 50, lines 45-52).

As to claim 37, Sennott et al. teaches wherein the data points further specifying altitude (See column 21, lines 64-68; column 22, lines 1-3; column 29, lines 45-52).

4. Claims 4, 15, 28 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sennott et al. (U.S. Patent No. 5,438,517) in view of Dayanand et al. (U.S. Patent No. 6,639,592).

As to claim 4, Sennott et al. still does not teach wherein the polynomial spline is selected from the group consisting of uniform non-rational B-spline, non-uniform non-rational B-spline, uniform Catmull-Rom spline, non-uniform Catmull-Rom spline, and NURBS.

Dayanand et al. teaches curve network modeling (See abstract), in which he teaches wherein the polynomial spline is selected from the group consisting of uniform non-rational B-spline, non-uniform non-rational B-spline, uniform Catmull-Rom spline, non-uniform Catmull-Rom spline, and NURBS (See abstract; column 2, lines 27-29; column 4, lines 20-29).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have modified Sennott et al., to include wherein the polynomial spline is selected from the group consisting of uniform non-rational B-spline, non-uniform non-rational B-spline, uniform Catmull-Rom spline, non-uniform Catmull-Rom spline, and NURBS.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Sennott et al., by the teachings of Dayanand et al. because wherein the polynomial spline is selected from the group consisting of uniform non-rational B-spline, non-uniform non-rational B-spline, uniform Catmull-Rom spline, non-uniform Catmull-Rom spline, and NURBS would enable a computer modeler to represent arbitrary curved surfaces very accurately (See Dayanand et al., column 1, lines 44-52).

As to claims 15, 28 and 35, Sennott et al. as modified, teaches wherein the polynomial spline is selected from the group consisting of uniform nonrational B-spline, non-uniform nonrational B-spline, uniform Catmull-Rom spline, nonuniform Catmull-Rom spline, and NURBS (See Dayanand et al., abstract; column 2, lines 27-29; column 4, lines 20-29); wherein the polynomial spline is selected from the group consisting of uniform nonrational B-spline, non-uniform nonrational B-spline, uniform Catmull-Rom spline, nonuniform Catmull-Rom spline, and NURBS (See Dayanand et al., abstract; column 2, lines 27-29; column 4, lines 20-29); wherein the polynomial spline is selected from the group consisting of a uniform nonrational B-spline, nonuniform nonrational B-spline, uniform Catmull-Rom spline, nonuniform Catmull-Rom spline, and NURBS (See Dayanand et al., abstract; column 2, lines 27-29; column 4, lines 20-29).

5. Claims 5-7 rejected under 35 U.S.C. 103(a) as being unpatentable over Sennott et al. (U.S. Patent No. 5,438,517) in view of Rohm et al. (U.S. Patent No. 6,253,164)

As to claim 5, Sennott et al., still does not teach defining a knot sequence for the polynomial spline.

Rohm et al. teaches curves and surfaces modeling based on a cloud of points (See abstract), in which he teaches defining a knot sequence for the polynomial spline (See column 4, lines 17-21).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention was made to have modified Sennott et al., to include defining a knot sequence for the polynomial spline.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Sennott et al., by the teachings of Rohm et al. because defining a knot sequence for the polynomial spline would allow the modeler to only capture spatial information and the system will generate all surfaces automatically (See Rohm et al., column 2, lines 32-34).

As to claim 6, Sennott et al. as modified, teaches manually defining the knot sequence (See Rohm et al., column 4, lines 17-33).

As to claim 7, Sennott et al. as modified, teaches storing the knot sequence in the second computer-usable database (See Rohm et al., column 4, lines 17-33).

***Response to Arguments***

6. Applicant's arguments filed on December 2, 2004, with respect to the rejected claims in view of the cited references have been considered but are moot in view of applicant's amended claims necessitate new ground(s) of rejection.

***Conclusion***

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mellissa M Chojnacki whose telephone number is (571) 272-4076. The examiner can normally be reached on 9:00am-5:30pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dov Popovici can be reached on (571) 272-4083. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

April 14, 2005  
Mmc



**SAM RIMELL**  
**PRIMARY EXAMINER**